PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-116732

(43)Date of publication of application : 19.04.2002

(51)Int.Cl. G09G 3/30
G09G 3/20
// H05B 33/14

(21)Application number : 2000-306504

(22)Date of filing : 05.10.2000

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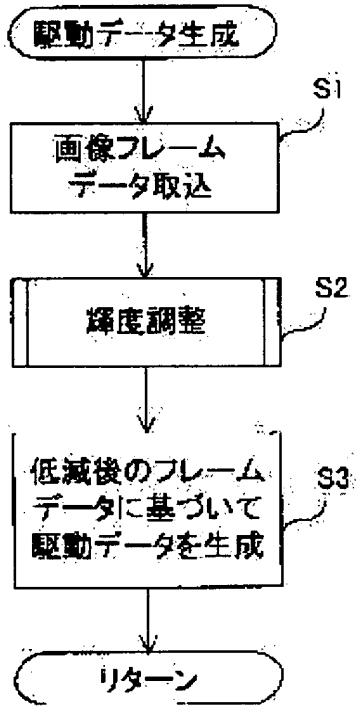
(54) LUMINOUS PANEL DRIVING METHOD AND DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the longer life and to execute electric power saving of a luminous panel.

SOLUTION: The luminous panel is driven in accordance with the luminance lowering data obtained by subjecting the image frame data to be displayed to luminance lowering processing by each of frames.



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CLAIMS

[Claim(s)]
[Claim 1] The actuation data of a frame unit are generated based on the data signal which contains image frame data for the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1, and this the point emitting light. It is the actuation approach which drives a spontaneous light panel and displays a two-dimensional image by this. The brightness reduction stroke which performs brightness reduction data processing about said image frame data that the pixel brightness which said image frame data express should be reduced per at least one frame, The approach characterized by including the generation stroke which generates said actuation data based on the image frame data after the brightness reduction concerned.
[Claim 2] Said brightness reduction stroke is an approach according to claim 1 characterized by including the stroke which makes data processing which reduces brightness at the rate of predetermined reduction for every pixel about said image frame data.
[Claim 3] Said rate of brightness reduction is an approach according to claim 2 characterized by being an uniform value regardless of the brightness of the pixel for reduction of said pixel data.
[Claim 4] Said rate of brightness reduction is an approach according to claim 2 characterized by being a value according to the brightness of said pixel data.
[Claim 5] Said rate of brightness reduction is an approach according to claim 2 characterized by becoming size, so that the brightness of said pixel for reduction becomes high.
[Claim 6] For said rate of brightness reduction, the degree of the increment on the low brightness range where the brightness of said pixel for reduction is low, and corresponding to buildup of brightness is the approach according to claim 5 characterized by the degree of the increment concerned being smallness rather than the brightness of said pixel for reduction can set outside said low brightness range.
[Claim 7] Said rate of reduction is an approach claim 2 characterized by changing according to the average luminance of the whole screen of the frame for brightness reduction with which it is expressed by said image frame data thru/or given in six.
[Claim 8] The approach according to claim 1 characterized by performing said brightness reduction stroke only when it is detected that the average luminance of said image frame of 1 exceeded predetermined level in said average luminance detection stroke including further the average luminance detection stroke in which the average luminance about the pixel in the frame for brightness reduction with which it is expressed by said image frame data detects that it is size from predetermined average luminance.
[Claim 9] The value of said rate of brightness reduction is the approach of any 1 publication of the claim which is characterized by being chosen as the value which does not spoil the profile of the frame image which said image frame data express and to precede.
[Claim 10] The detection stroke which the image frame of 1 with which said brightness reduction stroke is expressed by said image frame data is an image only containing an alphabetic character image, and detects that the rate of burning in said image frame of 1 exceeds 50%, In said detection stroke, the image frame of 1 expressed by said image frame data the reversal stroke which reverses the brightness of the

image frame data corresponding to said image frame of 1 when it is detected that the rate of burning in said image frame of 1 exceeds 50%, including only an alphabetic character image -- since -- the approach according to claim 1 characterized by becoming.
[Claim 11] Said detection stroke is an approach according to claim 10 characterized by detecting that it is an image only containing said alphabetic character image based on the information classification signal included in said data signal.
[Claim 12] The approach according to claim 10 or 11 characterized by said brightness reduction stroke including further the brilliance-control stroke performed after said reversal stroke.
[Claim 13] Said spontaneous light panel is the approach of any 1 publication of the claim which is characterized by being an organic EL panel and to precede.
[Claim 14] It is the spontaneous light panel driving gear which drives the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1 the point emitting light based on the data signal containing image frame data, and displays a two-dimensional image. An image frame generation means to extract said image frame data from said data signal, A brightness reduction means to adjust the value of said image frame data that the brightness of the frame unit which said image frame data express should be reduced, The spontaneous light panel driving gear characterized by including a generation means to generate said actuation data based on the image frame data after the brightness reduction concerned, and the driver which drives said spontaneous light panel according to said actuation data signal.
[Claim 15] Equipment according to claim 14 characterized by having further a data signal acceptance means to accept said data signal through an actuation input device, a transmitter-receiver, or a record medium.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the actuation approach of spontaneous light panels, such as an organic EL panel, and equipment.
[0002]
[Description of the Prior Art] The light emitting device from which spontaneous light panels, such as an organic EL panel and a plasma display panel, constitute a pixel unlike a liquid crystal panel emits light itself, and depends for the life and power consumption of each light emitting device on the product of stretching luminescence time amount and luminescence brightness. Therefore, it is not only able to prolong the life of a spontaneous light panel, if a spontaneous light panel driving gear can carry out compaction of the stretching luminescence time amount of each light emitting device, and reduction of luminescence brightness, but it ** to reduction of power consumption.
[0003] Then, although the reinforcement of a spontaneous light panel and low-power-izing have been benefited for various devices from the former, much more device is desired.
[0004]
[Problem(s) to be Solved by the Invention] Therefore, this invention is offering the actuation approach of a spontaneous light panel and equipment which prolonged the life of a spontaneous light panel and also made power-saving possible.
[0005]
[Means for Solving the Problem] The spontaneous light panel actuation approach by this invention generates the actuation data of a frame unit based on the data signal which contains image frame data for the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1, and this the point emitting light. The brightness reduction stroke which is the actuation approach which drives a spontaneous light panel and displays a two-dimensional image by this, and adjusts the value of said image frame data that the brightness of at least one frame unit which said image frame data express should be reduced, It is the approach characterized by including the generation stroke which generates said actuation data based on the image frame data after the brightness reduction concerned.
[0006] Moreover, the driving gear of the spontaneous light panel by this invention It is the spontaneous light panel driving gear which drives the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1 the point emitting light based on the data signal containing image frame data, and displays a two-dimensional image. An image frame generation means to extract said image frame data from said data signal, A brightness reduction means to adjust the value of said image frame data that the brightness of the frame unit which said image frame data express should be reduced, It is the spontaneous light panel driving gear characterized by including a generation means to generate said actuation data based on the image frame data after the brightness reduction concerned, and the driver which drives said spontaneous light panel according to said actuation data signal.

[0007]
[Embodiment of the Invention] Drawing 1 shows the transmitter-receiver containing the panel driving gear by this invention. This receiving set is contained in accepting stations, such as for example, a cellular-phone terminal, and the transceiver section 2 transmits and receives signal transmission through an antenna 1. The transceiver section 2 performs I/O of the data-processing circuit 3 and a transmitted and received data. The data-processing circuit 3 transmits the voice data to D/A and the A/D-conversion circuit 4, when the content of the received data received from the transceiver section 2 is voice data. After D/A and the A/D-conversion circuit 4 change the received voice data into an analog signal, it is supplied to the transducers 5, such as a telephone transmitter, and voice playback is presented with it. Moreover, the transducer 5 includes the voice analog signal generation means like a microphone, and supplies the voice analog signal according to an operator's voice to D/A and the A/D-conversion circuit 4. If D/A and the A/D-conversion circuit 4 change this voice analog signal into voice data and transmits to the data-processing circuit 3, the data-processing circuit 3 will transmit this voice data to the transceiver section 2. The transceiver section 2 changes this voice data into a predetermined communication link format, and transmits this through an antenna.
[0008] The data-processing circuit 3 performs various modes of operation besides the above-mentioned transceiver mode according to the command signal from a keyboard 6. For example, when image data is contained with the image display command in the commo data supplied through the transceiver section 2, image display mode which supplies an action command to the image display control circuit 7 with the image data and synchronizing signal is performed.
[0009] The image display control circuit 7 answers an action command from the data-processing circuit 3, receives image data with a synchronizing signal, controls the image display section 8 containing a flat panel 9, and manages image display actuation. The flat panel 9 contains the data electrode group and scan electrode group which cross mutually on both sides of luminous layers, such as for example, an organic electroluminescence layer, and this, and further, among these electrode groups, the scan driver 10 and the data driver 11 are formed so it may impress an electrical potential difference and may make the luminous layer in the intersection of an electrode group emit light as a pixel one by one. The scan driver 10 impresses a sequential-scanning pulse to each electrode of a scan electrode group synchronizing with the scan trigger pulse supplied from the image display control circuit 7, and acts as a scan driver. In addition, the example of the panel using this organic electroluminescence is indicated by JP,2000-259125,A.
[0010] The actuation data other than a data trigger pulse are supplied to the data driver 11 from the image display control circuit 7. Actuation data are supplied to the data driver 11 for every one-line image data corresponding to each scan line. The data driver 11 supplies the electrical potential difference or current corresponding to the one-line image data supplied synchronizing with a data trigger pulse to each electrode of a data electrode group.
[0011] In addition, the data-processing circuit 3 can also incorporate a data signal including an image frame data signal through the record-medium reader of memory card reader 12 grade. Furthermore, it is also considered that they are data processors, such as a personal computer without a transceiver function, as a data-processing circuit 3. Drawing 2 shows the example of a concrete circuit of the above-mentioned image display control circuit 7.
[0012] In this example of a concrete circuit, an image data signal is first supplied with a command from the data-processing circuit 3. Whether the image which the image data concerned bears is an animation, it is a still picture or it is only an alphabetic character, the image classification signal, and the synchronizing signal for image reconstruction are contained in this image data signal in many cases. Then, the classification signal extract circuit 20 extracts this image classification signal from an input image data signal. Moreover, the synchronizing signal extract circuit 21 extracts the synchronizing signal contained in an input image data signal. In addition, this classification signal and synchronizing signal may be made for the data-processing circuit 3 to extract, and the classification signal extract circuit 20 and the synchronizing signal extract circuit 21 are unnecessary in the image display control circuit 7 in that case.

[0013] The trigger signal generation circuit 22 generates the above-mentioned scan trigger pulse and the above-mentioned data trigger pulse according to the synchronizing signal supplied from the synchronizing signal extract circuit 21, and supplies these to the scan driver 10 and the data driver 11, respectively. Synchronizing with a synchronizing signal, a frame memory 23 supplies image data to the actuation data generation circuit 24 per frame while it incorporates image data for every frame selectively among the data supplied from the data-processing circuit 3.
[0014] The actuation data generation circuit 24 generates actuation data from the frame data supplied from a frame memory 23 according to the synchronizing signal from the synchronizing signal extract circuit 21, and the classification signal from a classification signal extract circuit, and supplies this to the data driver 11. The actuation data generation circuit 24 operates, as shown in the subroutine of drawing 3 . That is, the image frame data supplied are once incorporated first (step S1). Next, brightness reduction data processing which reduces the brightness of the incorporated image frame data concerned is performed (step S2). In this way, the actuation data described above based on the image frame data to which brightness reduction processing was performed are generated (step S3). By the way, do brightness reduction processing in step S2 by performing data processing so that the brightness Be of the pixel unit of the incorporated image frame data may reduce only the predetermined rate R of brightness reduction. Although the rate of brightness reduction in this case can also be made into 40% uniformly per frame irrespective of the magnitude of brightness Be, as shown in drawing 4 , it can also be set to the value according to the magnitude of brightness Be per frame. The rate R of reduction is zero, and when brightness Be becomes high gently along with the increment in brightness Be in the low brightness range and brightness Be is out of the low brightness range concerned, you may make it become high in proportion [almost] to buildup of brightness Be in the example of drawing 4 , when brightness Be is black level 0. Moreover, the rate R of brightness reduction may be continued and shifted to the whole brightness Be according to the average luminance Bav of a frame unit. This average luminance Bav is obtained by (total of brightness Be for every pixel in n frames)/(several Ns pixel of n frames). Here, n is the natural number.
[0015] Moreover, it is necessary to perform the above-mentioned brightness reduction data processing about no frames, and it can also be performed every other frame several frames of every. the pixel frame data incorporated in the invention in this application in short -- at least one frame unit -- and data processing which does not spoil the profile of an image and which reduces brightness is performed like. In this way, a spontaneous light panel is driven based on the obtained pixel frame data.
[0016] Drawing 5 shows another actuation data generating routine. In this routine, first, after incorporating image frame data, the average luminance Bav of a frame unit is computed (step S4). Subsequently, it distinguishes whether average luminance Bav is higher than predetermined level (step S5). When it is distinguished that average luminance Bav is higher than predetermined level, brightness reduction data processing in drawing 3 and same brightness reduction data processing are performed (step S2). And actuation data are generated based on the image frame data after brightness reduction (step S3). When it is distinguished in step S5 that average luminance Bav is below predetermined level, actuation data are generated based on this, without performing brightness reduction processing to taking-in image frame data (step S6).
[0017] Drawing 6 shows still more nearly another actuation data generating routine. In this routine, after incorporating image frame data first (step S1), the rate of burning of the incorporated image frame data is computed for every frame (step S7). This rate of burning is computed by the following formulas.
Rate of burning =(number of luminescence pixels in one frame)/(the total number of pixels in one frame)
Subsequently, it distinguishes as as soon as the obtained rate of burning is 50% or more (step S8). Here, suppose a luminescence pixel that the pixel of the brightness more than predetermined medium level is said, without limiting to the luminescence pixel of a white level. When you distinguish that the rate of burning is 50% or less, let frame data be actuation data as it is (step S6). the data which the frame data concerned show an alphabetic character image on the other hand when it is distinguished in step S8 that the rate of burning of the incorporated frame data is at 50% or more -- it is -- non-** is distinguished

(step S9). the case where data-processing circuit 3 self is performing the mode of operation which is the usual call between subscribers, for example although the distinction in this step S9 can be distinguished as be alike as soon as it is shown that the above-mentioned classification signal is an alphabetic character image -- table ** -- distinguishing that last **** screen is a screen which consists only of a figure or an alphabetic character is also considered.

[0018] In step S9, when it is judged that the content of frame data is not text, let frame data be actuation data as it is (step S6). On the other hand, when it is distinguished in step S9 that frame data show text, carry out brightness reversal of the frame data concerned, and let the obtained reversal frame data be actuation data (step S10).

[0019] In this way, in this routine, although it is also possible to transmit the obtained actuation data to the data driver 11 as it is, the brilliance control of all pixels is performed so that it may become suitable brightness further about the value of the total brightness which adds together the brightness of all the pixels of the frame unit of actuation data, and is obtained (step S11). In addition, although the above-mentioned example is an example using the panel driving gear according to this invention to a transmitter-receiver, the panel driving gear by this invention may be applied to all equipments, such as television containing a panel indicating equipment, and a personal computer.

[0020]

[Effect of the Invention] the panel driving gear according to this invention so that clearly from having explained above -- setting -- table ** -- since actuation data are generated based on the brightness reduction frame data obtained by performing brightness reduction data processing about last **** frame data and a spontaneous light panel is driven by this, it ** to the reinforcement of a panel, and power-saving.

[Translation done.]

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TECHNICAL FIELD

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PRIOR ART

[Description of the Prior Art] The light emitting device from which spontaneous light panels, such as an organic EL panel and a plasma display panel, constitute a pixel unlike a liquid crystal panel emits light itself, and depends for the life and power consumption of each light emitting device on the product of stretching luminescence time amount and luminescence brightness. Therefore, it is not only able to prolong the life of a spontaneous light panel, if a spontaneous light panel driving gear can carry out compaction of the stretching luminescence time amount of each light emitting device, and reduction of luminescence brightness, but it ** to reduction of power consumption.
[0003] Then, although the reinforcement of a spontaneous light panel and low-power-izing have been benefited for various devices from the former, much more device is desired.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Therefore, this invention is offering the actuation approach of a spontaneous light panel and equipment which prolonged the life of a spontaneous light panel and also made power-saving possible.

[Translation done.]

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MEANS

[Means for Solving the Problem] The spontaneous light panel actuation approach by this invention generates the actuation data of a frame unit based on the data signal which contains image frame data for the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1, and this the point emitting light. The brightness reduction stroke which is the actuation approach which drives a spontaneous light panel and displays a two-dimensional image by this, and adjusts the value of said image frame data that the brightness of at least one frame unit which said image frame data express should be reduced, It is the approach characterized by including the generation stroke which generates said actuation data based on the image frame data after the brightness reduction concerned.
[0006] Moreover, the driving gear of the spontaneous light panel by this invention It is the spontaneous light panel driving gear which drives the spontaneous light panel which makes the intersection of other electrode groups which intersect the electrode group of 1 the point emitting light based on the data signal containing image frame data, and displays a two-dimensional image. An image frame generation means to extract said image frame data from said data signal, A brightness reduction means to adjust the value of said image frame data that the brightness of the frame unit which said image frame data express should be reduced, It is the spontaneous light panel driving gear characterized by including a generation means to generate said actuation data based on the image frame data after the brightness reduction concerned, and the driver which drives said spontaneous light panel according to said actuation data signal.
[0007]
[Embodiment of the Invention] Drawing 1 shows the transmitter-receiver containing the panel driving gear by this invention. This receiving set is contained in accepting stations, such as for example, a cellular-phone terminal, and the transceiver section 2 transmits and receives signal transmission through an antenna 1. The transceiver section 2 performs I/O of the data-processing circuit 3 and a transmitted and received data. The data-processing circuit 3 transmits the voice data to D/A and the A/D-conversion circuit 4, when the content of the received data received from the transceiver section 2 is voice data. After D/A and the A/D-conversion circuit 4 change the received voice data into an analog signal, it is supplied to the transducers 5, such as a telephone transmitter, and voice playback is presented with it. Moreover, the transducer 5 includes the voice analog signal generation means like a microphone, and supplies the voice analog signal according to an operator's voice to D/A and the A/D-conversion circuit 4. If D/A and the A/D-conversion circuit 4 change this voice analog signal into voice data and transmits to the data-processing circuit 3, the data-processing circuit 3 will transmit this voice data to the transceiver section 2. The transceiver section 2 changes this voice data into a predetermined communication link format, and transmits this through an antenna.
[0008] The data-processing circuit 3 performs various modes of operation besides the above-mentioned transceiver mode according to the command signal from a keyboard 6. For example, when image data is contained with the image display command in the commo data supplied through the transceiver section 2, image display mode which supplies an action command to the image display control circuit 7 with the

image data and synchronizing signal is performed.
[0009] The image display control circuit 7 answers an action command from the data-processing circuit 3, receives image data with a synchronizing signal, controls the image display section 8 containing a flat panel 9, and manages image display actuation. The flat panel 9 contains the data electrode group and scan electrode group which cross mutually on both sides of luminous layers, such as for example, an organic electroluminescence layer, and this, and further, among these electrode groups, the scan driver 10 and the data driver 11 are formed so it may impress an electrical potential difference and may make the luminous layer in the intersection of an electrode group emit light as a pixel one by one. The scan driver 10 impresses a sequential-scanning pulse to each electrode of a scan electrode group synchronizing with the scan trigger pulse supplied from the image display control circuit 7, and acts as a scan driver. In addition, the example of the panel using this organic electroluminescence is indicated by JP,2000-259125,A.
[0010] The actuation data other than a data trigger pulse are supplied to the data driver 11 from the image display control circuit 7. Actuation data are supplied to the data driver 11 for every one-line image data corresponding to each scan line. The data driver 11 supplies the electrical potential difference or current corresponding to the one-line image data supplied synchronizing with a data trigger pulse to each electrode of a data electrode group.
[0011] In addition, the data-processing circuit 3 can also incorporate a data signal including an image frame data signal through the record-medium reader of memory card reader 12 grade. Furthermore, it is also considered that they are data processors, such as a personal computer without a transceiver function, as a data-processing circuit 3. Drawing 2 shows the example of a concrete circuit of the above-mentioned image display control circuit 7.
[0012] In this example of a concrete circuit, an image data signal is first supplied with a command from the data-processing circuit 3. Whether the image which the image data concerned bears is an animation, it is a still picture or it is only an alphabetic character, the image classification signal, and the synchronizing signal for image reconstruction are contained in this image data signal in many cases. Then, the classification signal extract circuit 20 extracts this image classification signal from an input image data signal. Moreover, the synchronizing signal extract circuit 21 extracts the synchronizing signal contained in an input image data signal. In addition, this classification signal and synchronizing signal may be made for the data-processing circuit 3 to extract, and the classification signal extract circuit 20 and the synchronizing signal extract circuit 21 are unnecessary in the image display control circuit 7 in that case.
[0013] The trigger signal generation circuit 22 generates the above-mentioned scan trigger pulse and the above-mentioned data trigger pulse according to the synchronizing signal supplied from the synchronizing signal extract circuit 21, and supplies these to the scan driver 10 and the data driver 11, respectively. Synchronizing with a synchronizing signal, a frame memory 23 supplies image data to the actuation data generation circuit 24 per frame while it incorporates image data for every frame selectively among the data supplied from the data-processing circuit 3.
[0014] The actuation data generation circuit 24 generates actuation data from the frame data supplied from a frame memory 23 according to the synchronizing signal from the synchronizing signal extract circuit 21, and the classification signal from a classification signal extract circuit, and supplies this to the data driver 11. The actuation data generation circuit 24 operates, as shown in the subroutine of drawing 3 . That is, the image frame data supplied are once incorporated first (step S1). Next, brightness reduction data processing which reduces the brightness of the incorporated image frame data concerned is performed (step S2). In this way, the actuation data described above based on the image frame data to which brightness reduction processing was performed are generated (step S3). By the way, do brightness reduction processing in step S2 by performing data processing so that the brightness Be of the pixel unit of the incorporated image frame data may reduce only the predetermined rate R of brightness reduction. Although the rate of brightness reduction in this case can also be made into 40% uniformly per frame irrespective of the magnitude of brightness Be, as shown in drawing 4 , it can also be set to the value according to the magnitude of brightness Be per frame. The rate R of reduction is zero, and when

brightness Be becomes high gently along with the increment in brightness Be in the low brightness range and brightness Be is out of the low brightness range concerned, you may make it become high in proportion [almost] to buildup of brightness Be in the example of drawing 4 , when brightness Be is black level 0. Moreover, the rate R of brightness reduction may be continued and shifted to the whole brightness Be according to the average luminance Bav of a frame unit. This average luminance Bav is obtained by (total of brightness Be for every pixel in n frames)/(several Ns pixel of n frames). Here, n is the natural number.

[0015] Moreover, it is necessary to perform the above-mentioned brightness reduction data processing about no frames, and it can also be performed every other frame several frames of every. the pixel frame data incorporated in the invention in this application in short -- at least one frame unit -- and data processing which does not spoil the profile of an image and which reduces brightness is performed like. In this way, a spontaneous light panel is driven based on the obtained pixel frame data.

[0016] Drawing 5 shows another actuation data generating routine. In this routine, first, after incorporating image frame data, the average luminance Bav of a frame unit is computed (step S4). Subsequently, it distinguishes whether average luminance Bav is higher than predetermined level (step S5). When it is distinguished that average luminance Bav is higher than predetermined level, brightness reduction data processing in drawing 3 and same brightness reduction data processing are performed (step S2). And actuation data are generated based on the image frame data after brightness reduction (step S3). When it is distinguished in step S5 that average luminance Bav is below predetermined level, actuation data are generated based on this, without performing brightness reduction processing to taking-in image frame data (step S6).

[0017] Drawing 6 shows still more nearly another actuation data generating routine. In this routine, after incorporating image frame data first (step S1), the rate of burning of the incorporated image frame data is computed for every frame (step S7). This rate of burning is computed by the following formulas.

Rate of burning =(number of luminescence pixels in one frame)/(the total number of pixels in one frame)

Subsequently, it distinguishes as as soon as the obtained rate of burning is 50% or more (step S8). Here, suppose a luminescence pixel that the pixel of the brightness more than predetermined medium level is said, without limiting to the luminescence pixel of a white level. When you distinguish that the rate of burning is 50% or less, let frame data be actuation data as it is (step S6). the data which the frame data concerned show an alphabetic character image on the other hand when it is distinguished in step S8 that the rate of burning of the incorporated frame data is at 50% or more -- it is -- non-** is distinguished (step S9). the case where data-processing circuit 3 self is performing the mode of operation which is the usual call between subscribers, for example although the distinction in this step S9 can be distinguished as be alike as soon as it is shown that the above-mentioned classification signal is an alphabetic character image -- table ** -- distinguishing that last **** screen is a screen which consists only of a figure or an alphabetic character is also considered.

[0018] In step S9, when it is judged that the content of frame data is not text, let frame data be actuation data as it is (step S6). On the other hand, when it is distinguished in step S9 that frame data show text, carry out brightness reversal of the frame data concerned, and let the obtained reversal frame data be actuation data (step S10).

[0019] In this way, in this routine, although it is also possible to transmit the obtained actuation data to the data driver 11 as it is, the brilliance control of all pixels is performed so that it may become suitable brightness further about the value of the total brightness which adds together the brightness of all the pixels of the frame unit of actuation data, and is obtained (step S11). In addition, although the above-mentioned example is an example using the panel driving gear according to this invention to a transmitter-receiver, the panel driving gear by this invention may be applied to all equipments, such as television containing a panel indicating equipment, and a personal computer.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram showing the transmitter-receiver containing the panel driving gear by this invention.
[Drawing 2] The block diagram showing the example of a circuit of the image display control circuit by this invention.
[Drawing 3] The flow chart which shows an activation ******** actuation data generation subroutine in the equipment shown in drawing 1 .
[Drawing 4] The graph which shows the example of change over pixel brightness change of the rate of brightness reduction in brightness reduction data processing in the subroutine shown in drawing 3 .
[Drawing 5] The flow chart which indicates another actuation data generation subroutine to be drawing 3 .
[Drawing 6] Furthermore, the flow chart which shows another actuation data generation subroutine.
[Description of Notations]
1 Antenna
2 Transceiver Section
3 Data-Processing Circuit
7 Image Display Control Circuit
8 Image Display Section
9 Flat Panel

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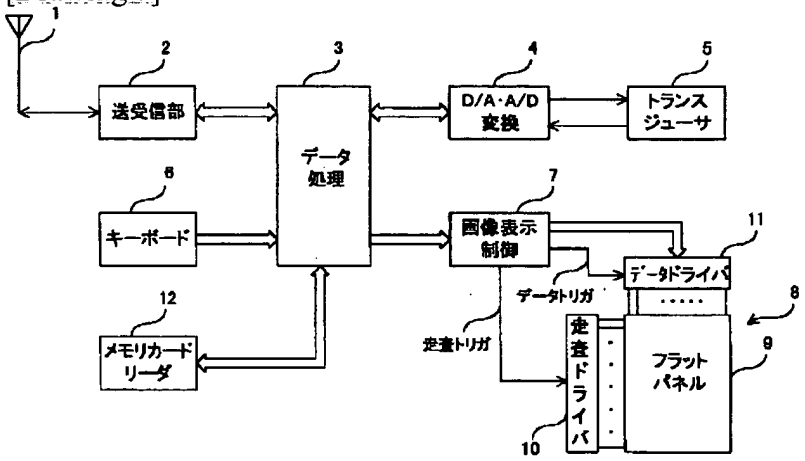
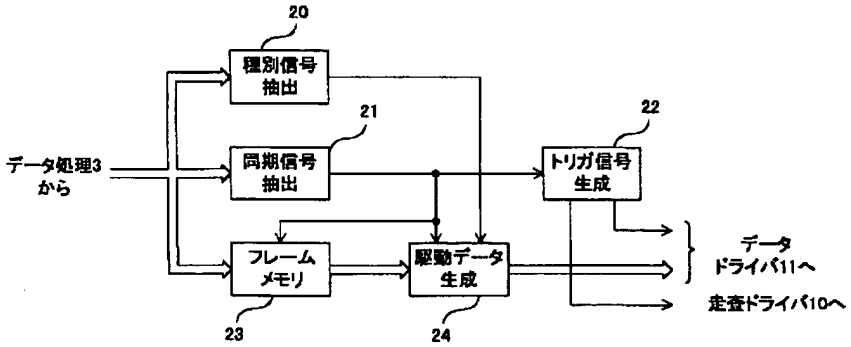
DRAWINGS

[Drawing 1]

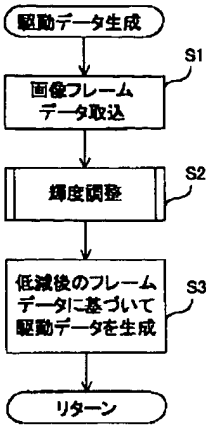


[Drawing 2]

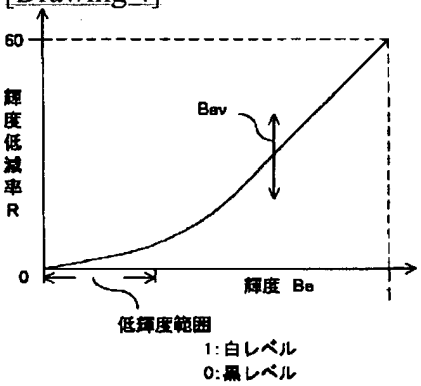
7



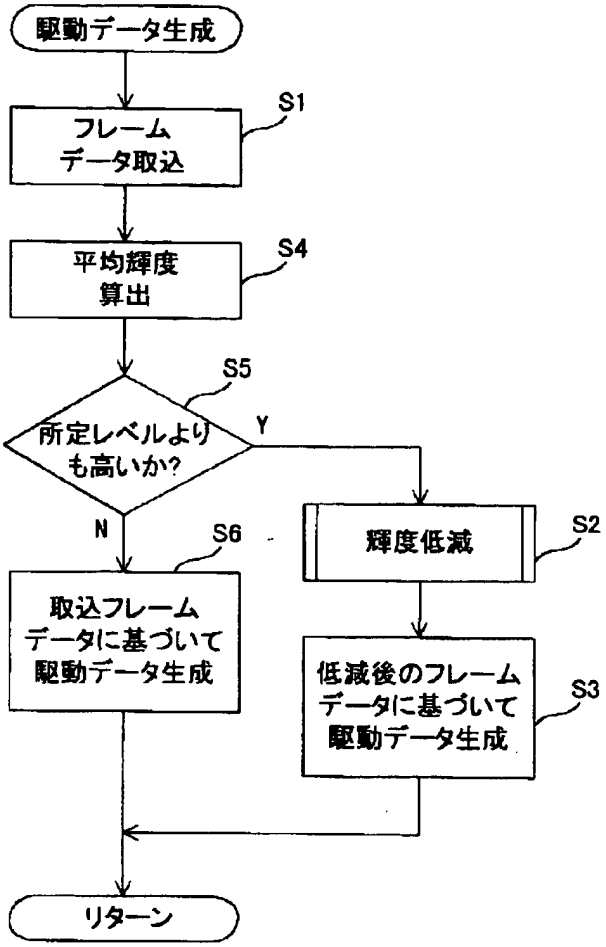
[Drawing 3]



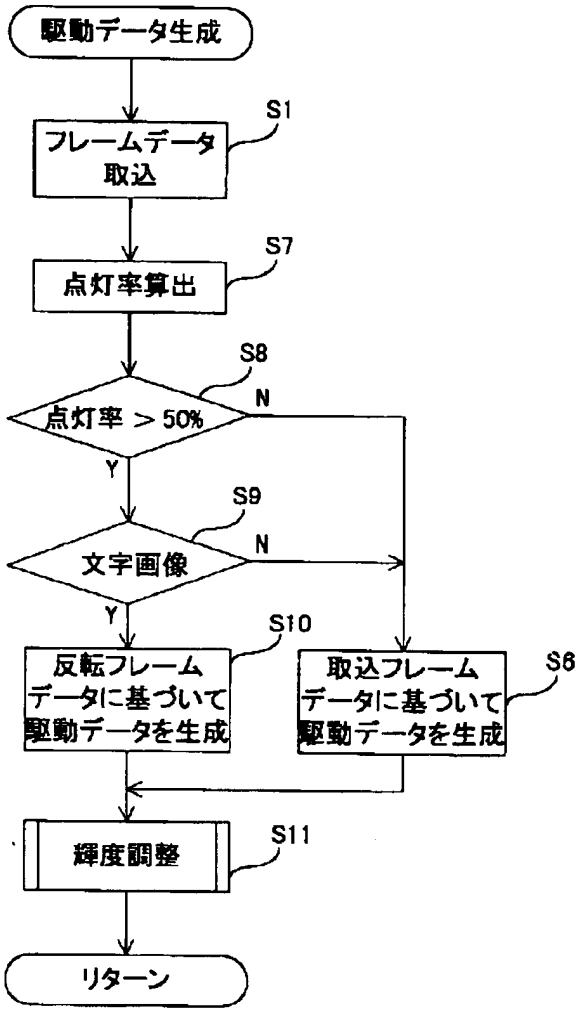
[Drawing 4]



[Drawing 5]


駆動データ生成
フレーム
データ取込
S1
平均輝度
算出
S4
S5
所定レベルより
も高いか?
Y
N
S6
輝度低減
S2
取込フレーム
データに基づいて
駆動データ生成
低減後のフレーム
データに基づいて
駆動データ生成
S3
リターン

[Drawing 6]



[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2002－116732
（P2002－116732A）
(43)公開日　平成14年４月19日(2002.4.19)

(51)Int.Cl.⁷		識別記号	FI		テーマコード(参考)
Ｇ０９Ｇ	3/30		Ｇ０９Ｇ 3/30	Ｋ	３Ｋ００７
	3/20	６４２	3/20	６４２Ｚ	５Ｃ０８０
		６７０		６７０Ｊ	
// Ｈ０５Ｂ	33/14		Ｈ０５Ｂ 33/14	Ａ	

審査請求　未請求　請求項の数15　ＯＬ　（全 ６ 頁）

(21)出願番号　特願2000－306504(P2000－306504)

(22)出願日　平成12年10月５日(2000.10.5)

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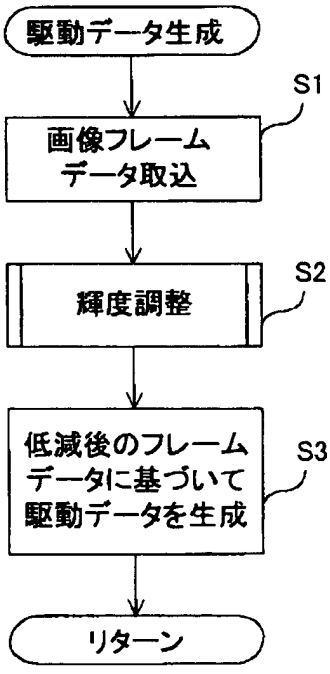
最終頁に続く

(54)【発明の名称】　自発光パネル駆動方法及び装置

(57)【要約】
【解決課題】　自発光パネルの長寿命化及び省電力化を図る。
【解決手段】　表示さるべき画像フレームデータに対して、フレーム毎に輝度低減処理を施して得られる輝度低減データに基づいて自発光パネルを駆動する。



【特許請求の範囲】

【請求項１】　１の電極群とこれに交叉する他の電極群の交点を発光点とする自発光パネルを画像フレームデータを含むデータ信号に基づいてフレーム単位の駆動データを生成して、これによって自発光パネルを駆動して２次元画像を表示する駆動方法であって、

前記画像フレームデータの表わす画素輝度を少なくとも１つのフレーム単位にて低減すべく前記画像フレームデータについて輝度低減データ処理を施す輝度低減行程と、

当該輝度低減後の画像フレームデータに基づいて前記駆動データを生成する生成行程と、を含むことを特徴とする方法。

【請求項２】　前記輝度低減行程は、前記画像フレームデータについて画素毎に所定低減率にて輝度を低減するデータ処理をなす行程を含むことを特徴とする請求項１記載の方法。

【請求項３】　前記輝度低減率は、前記画素データのうちの低減対象画素の輝度に無関係に一律の値であることを特徴とする請求項２記載の方法。

【請求項４】　前記輝度低減率は、前記画素データの輝度に応じた値であることを特徴とする請求項２記載の方法。

【請求項５】　前記輝度低減率は、前記低減対象画素の輝度が高くなる程大となることを特徴とする請求項２記載の方法。

【請求項６】　前記輝度低減率は、前記低減対象画素の輝度が低い低輝度範囲においては輝度の増大に対応する増加の度合いが、前記低減対象画素の輝度が前記低輝度範囲の外におけるよりも当該増加の度合いが小であることを特徴とする請求項５記載の方法。

【請求項７】　前記低減率は、前記画像フレームデータによって表わされる輝度低減対象フレームの画面全体の平均輝度に応じて変化することを特徴とする請求項２ないし６記載の方法。

【請求項８】　前記画像フレームデータによって表わされる輝度低減対象フレーム中の画素についての平均輝度が所定平均輝度よりも大であることを検出する平均輝度検出行程を更に含み、前記平均輝度検出行程において前記１の画像フレームの平均輝度が所定レベルを超えたことが検出された場合のみ、前記輝度低減行程を実行することを特徴とする請求項１記載の方法。

【請求項９】　前記輝度低減率の値は、前記画像フレームデータの表わすフレーム画像の輪郭を損なわない値に選択されていることを特徴とする先行する請求項のいずれか１記載の方法。

【請求項１０】　前記輝度低減行程が、前記画像フレームデータによって表わされる１の画像フレームが、文字画像のみを含む画像でありかつ前記１の画像フレーム内の点灯率が５０％を超えることを検出する検出行程と、前記検出行程において、前記画像フレームデータによって表わされる１の画像フレームが、文字画像のみを含みかつ前記１の画像フレーム内の点灯率が５０％を超えることを検出した場合、前記１の画像フレームに対応する画像フレームデータの輝度を反転する反転行程と、からなることを特徴とする請求項１記載の方法。

【請求項１１】　前記検出行程は、前記データ信号に含まれる情報種別信号に基づいて、前記文字画像のみを含む画像であることを検出することを特徴とする請求項１０記載の方法。

【請求項１２】　前記輝度低減行程が、前記反転行程の後に実行される輝度調整行程を更に含むことを特徴とする請求項１０または１１記載の方法。

【請求項１３】　前記自発光パネルは、有機ＥＬパネルであることを特徴とする先行する請求項のいずれか１記載の方法。

【請求項１４】　１の電極群に交差する他の電極群の交点を発光点とする自発光パネルを画像フレームデータを含むデータ信号に基づいて駆動して２次元画像を表示する自発光パネル駆動装置であって、

前記データ信号から前記画像フレームデータを抽出する画像フレーム生成手段と、

前記画像フレームデータの表わすフレーム単位の輝度を低減すべく前記画像フレームデータの値を調整する輝度低減手段と、

当該輝度低減後の画像フレームデータに基づいて前記駆動データを生成する生成手段と、

前記駆動データ信号に応じて前記自発光パネルを駆動するドライバと、を含むことを特徴とする自発光パネル駆動装置。

【請求項１５】　前記データ信号を、操作入力装置、送受信装置又は記録媒体を介して受け入れるデータ信号受け入れ手段を更に有することを特徴とする請求項１４記載の装置。

【発明の詳細な説明】

【０００１】

【技術分野】本発明は、有機ＥＬパネル等の自発光パネルの駆動方法及び装置に関する。

【０００２】

【従来技術】有機ＥＬパネルやプラズマディスプレイパネルなどの自発光パネルは、液晶パネルとは異なり、画素を構成する発光素子が自ら発光するのであり、各発光素子の寿命及び消費電力は、延べ発光時間と発光輝度との積に依存している。従って、自発光パネル駆動装置が、各発光素子の延べ発光時間の短縮や発光輝度の低減をすることが出来れば、自発光パネルの寿命を延ばすことが可能であるのみならず消費電力の低減にも資する。

【０００３】そこで、従来から、自発光パネルの長寿命化及び低消費電力化のために種々の工夫がなされて来ているが、一層の工夫が望まれる。

【0004】
【発明が解決しようとする課題】よって、本発明は、自発光パネルの寿命を延ばしかつ省電力化も可能にした自発光パネルの駆動方法及び装置を提供することである。
【0005】
【課題を解決するための手段】本発明による自発光パネル駆動方法は、1の電極群とこれに交叉する他の電極群の交点を発光点とする自発光パネルを画像フレームデータを含むデータ信号に基づいてフレーム単位の駆動データを生成して、これによって自発光パネルを駆動して2次元画像を表示する駆動方法であって、前記画像フレームデータの表わす少なくとも1つのフレーム単位の輝度を低減すべく前記画像フレームデータの値を調整する輝度低減行程と、当該輝度低減後の画像フレームデータに基づいて前記駆動データを生成する生成行程と、を含むことを特徴とする方法である。
【0006】また、本発明による自発光パネルの駆動装置は、1の電極群に交差する他の電極群の交点を発光点とする自発光パネルを画像フレームデータを含むデータ信号に基づいて駆動して2次元画像を表示する自発光パネル駆動装置であって、前記データ信号から前記画像フレームデータを抽出する画像フレーム生成手段と、前記画像フレームデータの表わすフレーム単位の輝度を低減すべく前記画像フレームデータの値を調整する輝度低減手段と、当該輝度低減後の画像フレームデータに基づいて前記駆動データを生成する生成手段と、前記駆動データ信号に応じて前記自発光パネルを駆動するドライバと、を含むことを特徴とする自発光パネル駆動装置である。
【0007】
【発明の実施の形態】図1は、本発明によるパネル駆動装置を含む送受信装置を示している。この受信装置は、例えば、携帯電話端末等の受信端末に含まれ、アンテナ1を介して送受信部2が通信信号を送受信する。送受信部2はデータ処理回路3と送受信データの入出力を行う。データ処理回路3は、送受信部2から受け取った受信データの内容が音声データであるときは、D/A・A/D変換回路4にその音声データを転送する。D/A・A/D変換回路4は、受信した音声データをアナログ信号に変換した後、送話器等のトランスジューサ5に供給して、音声再生に供する。また、トランスジューサ5は、マイクロホンの如き音声アナログ信号生成手段を含んでおり、操作者の音声に応じた音声アナログ信号をD/A・A/D変換回路4に供給する。D/A・A/D変換回路4が、この音声アナログ信号を音声データに変換して、データ処理回路3に転送すると、データ処理回路3は、この音声データを送受信部2に転送する。送受信部2は、この音声データを所定の通信フォーマットに変換してこれをアンテナを介して送信するのである。
【0008】データ処理回路3は、キーボード6からの指令信号に応じて、上記した送受信モードの他に様々な動作モードを実行する。例えば、送受信部2を経て供給された通信データの中に画像表示コマンドと共に画像データが含まれている場合には、画像表示制御回路7にその画像データや同期信号と共に動作コマンドを供給する画像表示モードを実行する。
【0009】画像表示制御回路7は、データ処理回路3からの動作コマンドに応答して、画像データを同期信号と共に受信して、フラットパネル9を含む画像表示部8を制御して、画像表示動作を司る。フラットパネル9は、例えば、有機EL層等の発光層とこれを挟んで互いに交差するデータ電極群及び走査電極群とを含んでおり、更に、これらの電極群の間に、順次、電圧を印加して電極群の交点における発光層を画素として発光せしめるべく、走査ドライバ10及びデータドライバ11が設けられている。走査ドライバ10は、画像表示制御回路7から供給される走査トリガパルスに同期して走査電極群の各電極に順次走査パルスを印加して走査ドライバとして作用する。なお、かかる有機ELを用いたパネルの例が特開平2000-259125号に開示されている。
【0010】データドライバ11には、画像表示制御回路7からデータトリガパルスの他に駆動データが供給される。駆動データは、各走査ラインに対応する1ライン画像データ毎にデータドライバ11に供給される。データドライバ11は、データトリガパルスに同期して供給される1ライン画像データに対応した電圧若しくは電流をデータ電極群の各電極に供給するのである。
【0011】なお、データ処理回路3は、メモリカードリーダ12等の記録媒体読取装置を介して、画像フレームデータ信号を含むデータ信号を取り込むことも出来る。更に、データ処理回路3としては、送受信機能を持たないパソコンなどのデータ処理装置であることも考えられる。図2は、上記した画像表示制御回路7の具体回路例を示している。
【0012】この具体回路例においては、まず、データ処理回路3からコマンドと共に画像データ信号が供給される。この画像データ信号には、当該画像データが担う画像が動画であるか、静止画であるか、若しくは文字のみであるか等の画像種別信号と画像再生の為の同期信号が含まれていることが多い。そこで、種別信号抽出回路20は、かかる画像種別信号を入力画像データ信号から抽出する。また、同期信号抽出回路21は、入力画像データ信号に含まれる同期信号を抽出する。なお、かかる種別信号及び同期信号は、データ処理回路3が抽出することにしても良く、その場合は、種別信号抽出回路20及び同期信号抽出回路21は画像表示制御回路7には不要である。
【0013】トリガ信号生成回路22は、同期信号抽出回路21から供給される同期信号に従って、上記した走

査トリガパルス及びデータトリガパルスを生成して、これらをそれぞれ走査ドライバ１０及びデータドライバ１１に供給する。フレームメモリ２３は、同期信号に同期しつつ、データ処理回路３から供給されるデータのうち画像データを選択的にフレーム毎に取り込むと共に画像データをフレーム単位に駆動データ生成回路２４に供給する。

【００１４】駆動データ生成回路２４は、同期信号抽出回路２１からの同期信号と種別信号抽出回路からの種別信号とに応じて、フレームメモリ２３から供給されるフレームデータから駆動データを生成して、これをデータドライバ１１に供給する。駆動データ生成回路２４は、図３のサブルーチンに示す如く動作する。すなわち、まず、供給される画像フレームデータを一旦取り込む（ステップＳ１）。次に、当該取り込んだ画像フレームデータの輝度を低減する輝度低減データ処理を行なう(ステップＳ２)。こうして、輝度低減処理を施された画像フレームデータに基づいて上記した駆動データを生成するのである（ステップＳ３）。ところで、ステップＳ２における輝度低減処理は、例えば、取り込んだ画像フレームデータの画素単位の輝度Ｂｅが所定の輝度低減率Ｒだけ低減するようにデータ処理を施すことによってなされ得る。この場合の輝度低減率は、輝度Ｂｅの大きさに拘わらずフレーム単位で一律に例えば４０％とすることも出来るが、図４に示した如く、輝度Ｂｅの大きさに応じた値にフレーム単位で定めることも出来る。図４の例においては、輝度Ｂｅが黒レベル０であるときは、低減率Ｒはゼロであり、輝度Ｂｅが低輝度範囲においては、輝度Ｂｅの増加につれて緩やかに高くなり、輝度Ｂｅが当該低輝度範囲の外にある場合には、輝度Ｂｅの増大にほぼ比例して高くなるようにしても良い。また、輝度低減率Ｒをフレーム単位の平均輝度Ｂａｖに応じて、輝度Ｂｅ全体に亘ってシフトさせても良い。この平均輝度Ｂａｖは、（ｎフレーム中の画素毎の輝度Ｂｅの合算）／（ｎフレームの画素数Ｎ）によって得られる。ここで、ｎは自然数である。

【００１５】また、上記した輝度低減データ処理は、全てのフレームについて実行する必要はなく、１フレームおきや数フレームおきに実行することも出来る。要するに、本願発明においては、取り込んだ画素フレームデータを、少なくとも１つのフレーム単位にかつ画像の輪郭を損なわない様に、輝度を低減するデータ処理を施すのである。こうして得られた画素フレームデータに基づいて自発光パネルを駆動するのである。

【００１６】図５は、別の駆動データ生成ルーチンを示している。このルーチンにおいては、まず、画像フレームデータを取り込んだ後に、フレーム単位の平均輝度Ｂａｖを算出する（ステップＳ４）。ついで、平均輝度Ｂａｖが所定レベルよりも高いか否かを判別する(ステップＳ５）。もし、平均輝度Ｂａｖが所定レベルより高いことを判別した場合、図３における輝度低減データ処理と同様な輝度低減データ処理を実行する(ステップＳ２）。そして、輝度低減後の画像フレームデータに基づいて駆動データを生成する(ステップＳ３）。もし、ステップＳ５において、平均輝度Ｂａｖが所定レベル以下であることを判別した場合、取込画像フレームデータに輝度低減処理を施すこと無くこれに基づいて駆動データを生成する(ステップＳ６）。

【００１７】図６は、更に別の駆動データ生成ルーチンを示している。このルーチンにおいては、まず画像フレームデータを取り込んだ(ステップＳ１）後に、取り込んだ画像フレームデータの点灯率をフレーム毎に算出する（ステップＳ７)。この点灯率は以下の式によって算出される。

点灯率＝（１フレーム中の発光画素数）／（１フレーム中の総画素数）

次いで、得られた点灯率が５０％以上であるや否やと判別する（ステップＳ８）。ここで、発光画素とは、白レベルの発光画素に限定することなく所定中間レベル以上の輝度の画素をいうこととする。点灯率が５０％以下であることを判別したときは、フレームデータをそのまま駆動データとする（ステップＳ６)。一方、取り込んだフレームデータの点灯率が５０％以上でであることをステップＳ８において判別した場合、当該フレームデータが文字画像を示すデータであるや否やを判別する（ステップＳ９)。このステップＳ９における判別は、上記した種別信号が文字画像であることを示すや否やによって判別することが可能であるが、例えば、データ処理回路３自身が、通常の加入者間通話である動作モードを実行している場合、表示さるべき画面は、数字や文字のみからなる画面であると判別することも考えられる。

【００１８】ステップＳ９において、フレームデータの内容が文字情報ではないと判断した場合、フレームデータをそのまま駆動データとする（ステップＳ６)。一方、ステップＳ９において、フレームデータが文字情報を示すことを判別した場合、当該フレームデータを輝度反転して、得られた反転フレームデータを駆動データとする（ステップＳ１０)。

【００１９】こうして得られた駆動データをそのままデータドライバ１１に転送することも可能であるが、本ルーチンにおいては、更に、駆動データのフレーム単位の全画素の輝度を合算して得られる合算輝度の値を適当な輝度になるように、全画素の輝度調整を行う（ステップＳ１１)。なお、上記した実施例は、送受信装置に本発明によるパネル駆動装置を用いた例であるが、本発明によるパネル駆動装置は、パネル表示装置を含むテレビジョン、パーソナルコンピュータ等のあらゆる装置に適用され得る。

【００２０】

【発明の効果】以上説明したことから明らかな如く、本

発明によるパネル駆動装置においては、表示さるべきフレームデータについて、輝度低減データ処理を施して得られる輝度低減フレームデータに基づいて駆動データを生成して、これによって自発光パネルを駆動するので、パネルの長寿命化及び省電力化に資するのである。

【図面の簡単な説明】

【図1】本発明によるパネル駆動装置を含む送受信装置を示すブロック図。

【図2】本発明による画像表示制御回路の回路例を示すブロック図。

【図3】図1において示された装置において実行さるべき駆動データ生成サブルーチンを示すフローチャート。

【図4】図3に示されたサブルーチンにおける輝度低減データ処理における輝度低減率の画素輝度変化に対する変化例を示すグラフ。

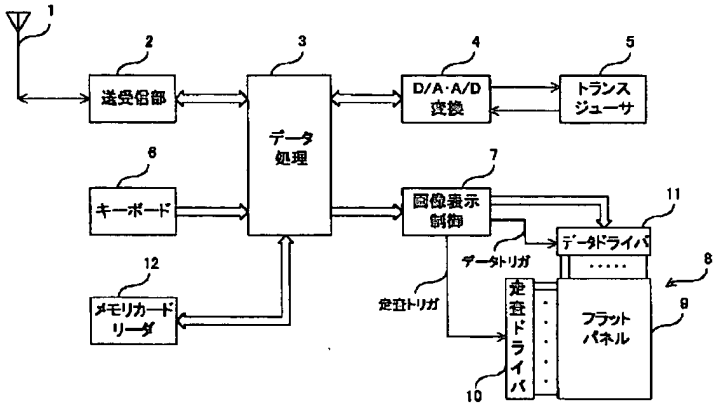
【図5】図3とは別の駆動データ生成サブルーチンを示すフローチャート。

【図6】更に別の駆動データ生成サブルーチンを示すフローチャート。

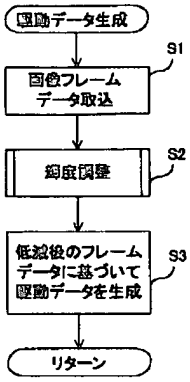
【符号の説明】

1 アンテナ
2 送受信部
3 データ処理回路
7 画像表示制御回路
8 画像表示部
9 フラットパネル

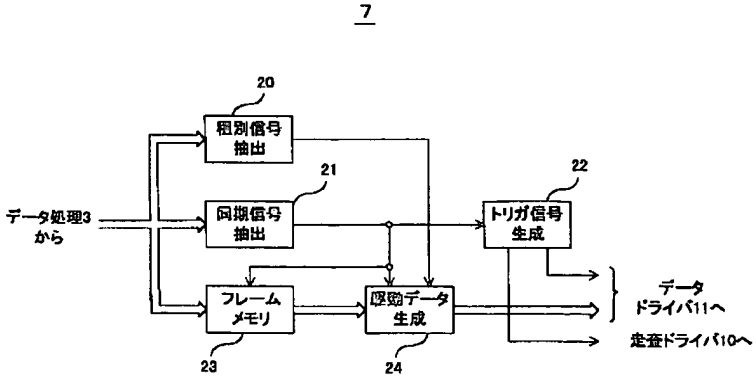
【図1】



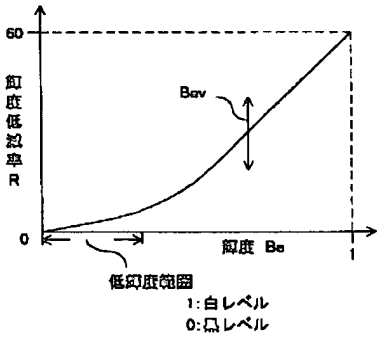
【図3】



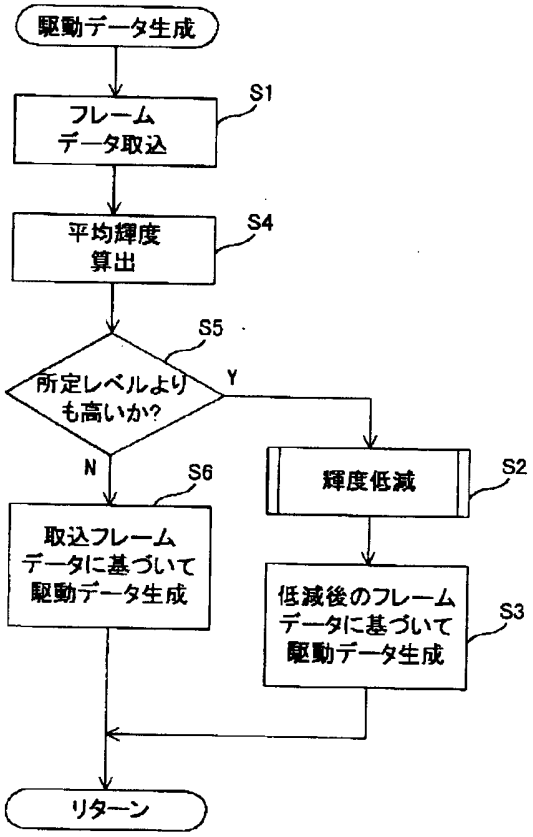
【図2】



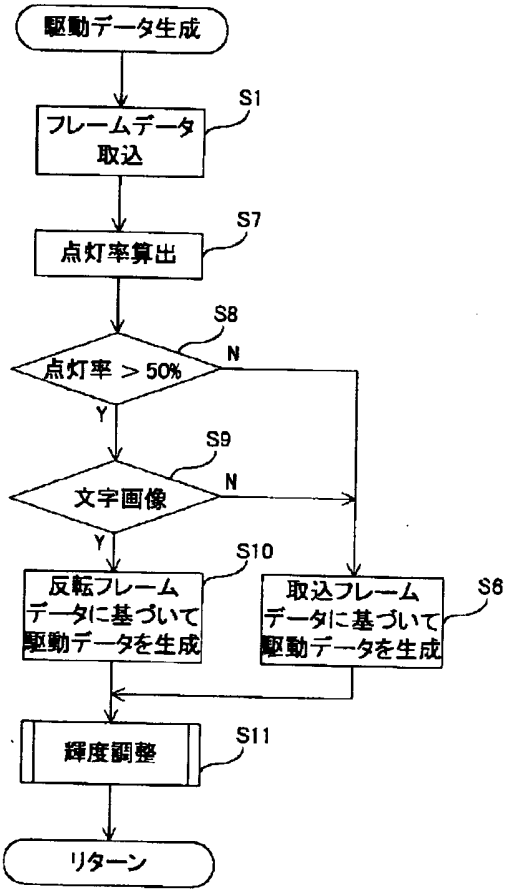
【図4】



【図5】



【図6】



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Fターム(参考)　3K007 AB03 AB11 GA04
5C080 AA06 BB05 DD26 DD29 EE28
JJ02 JJ05 JJ07 KK07 KK47